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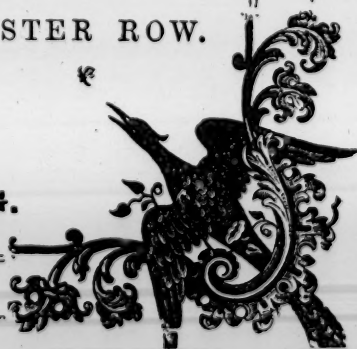
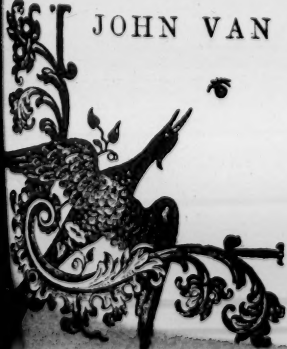
THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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A popular Treatise on the Fur-bearing Animals of the Mackenzie River District. By BERNARD ROGAN ROSS, C.T.*

IN submitting the following treatise to the notice of the Natural History Society of Montreal, I will, previously to entering on my subject, mark out the extent of country to which only my remarks apply.

A residence of thirteen years in this district, during the greatest part of which I have been a not unsuccessful trapper, has afforded me many opportunities of observation upon the nature and habits of the various fur-bearing animals inhabiting these high northern latitudes. I have throughout studied accuracy rather than effect, and the style of my remarks is doubtless rather popular than scientific; yet the hope that my humble endeavours may perchance clear one doubtful point, or illustrate some new truth, has lightened my labour, and will, if such should in reality happen, prove an ample recompense for my toil.

The boundaries of the Mackenzie River district may be considered to extend from Salt River, a tributary of the Slave to the Arctic Sea, and from 100° W. long. to the Rocky Mountains.

I cannot here omit mentioning the aid which I have received, in the scientific parts of the treatise, from the splendid, complete, and accurate work of Professor Baird on North American Mammals. The general characteristics of families are quoted *verbatim* from his work.

Lynx canadensis. Size between that of a fox and wolf. Tail thickly furred, shorter than the head and tipped with black. Paws densely covered with hair, and armed with strong claws. Colour in winter a silver gray on the back, paling towards the belly, which is sometimes white; a rufous under shade mixes with tints. The ears are pointed, not large, and tipped with a pencil of long black hairs. Whiskers generally white. Length from the tip of the nose to the tip of the tail about 3 feet. Average weight about 25 lbs.

This species is the largest of the North American lynxes, and is the only one found in the Mackenzie River district. It is called by the "winterers" indifferently either "lynx cat," "loup cervier" or "pichen." In appearance it is rather formidable; its teeth are long and sharp, while its powerful claws and immense spring render it a dangerous

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opponent to any animal that it encounters. In its habits it is predatory. Hares and mice it devours with avidity; birds it pursues to the tops of the loftiest trees, and it even kills fish in their own element; while it has no objection to carrion, and, when pressed by hunger, will even eat its own kind. Tales of the ferocity of this animal have been told by the early writers, of its attacking and mastering deer, but they are without foundation. It is a solitary beast, and I should consider its unaided strength perfectly incompetent for such a purpose.

In its motions, though very active, the lynx is rather an ungainly animal. Its favourite pace is a succession of long leaps, much in the manner of the American hare (*Lepus americanus*), which it also slightly resembles in shape. It is stupid and easily caught. A sudden and loud cry from the hunter pursuing it is sufficient to arrest its course for a time long enough to permit him to fire, and sometimes several shots are obtained at the same animal in this manner. It is easily killed, a not very heavy blow being sufficient to fracture its skull.

The colour of the fur varies much with the seasons. In winter the hair is thick, long and silky. The gray markings are of a dark silver colour, while the rufous under shade is scarcely observable. In some specimens the dark stripe down the back would not disgrace a silver fox. In summer it wears a rusty look, the hair is short and thin, and there is more rufous and little of the silvery gray in the tints, while the skin is marked with black spots, which serve to distinguish a prime from a common fur in trading with the natives. These spots appear generally in April and disappear in November.

The lynx is found all over this district, in greater or lesser numbers, wherever there are trees, even within the Arctic Circle. It is subject, like most of the other fur animals, to periodical migrations, which appear to occur with great regularity in periods of ten years, and which in its case depends on the hare, its principal food. One of the most curious of the idiosyncrasies of this animal is its passion for perfumes, and particularly for the odour of castoreum, which forms the basis of all the "medicines" used by trappers in effecting the capture of the lynx.

There are four methods in which the death or capture of the lynx is effected,—by hunting, by the use of the steel-trap or gin, by the simple snare, and by the medicated cabin,—all of which I shall pass briefly in review.

By hunting:—In this method the hunter pursues the animal, generally aided by a dog, and follows its track in the snow until he forces

it to take refuge in a tree, when it is shot; yet so tenacious is the death-grip of its powerful claws, that it is sometimes necessary for him to fell the tree in order to obtain the body.

By the steel-trap:—The gin, covered inside the jaws with a well-fitting “pallet” of birch bark, is placed indifferently either under or upon the snow, and on the pallet a piece of hare-skin, well-rubbed with the “medicine” is tied. The lynx, on scenting his favourite perfume, endeavours to withdraw the skin with his paw, and consequently springs the trap. It does not, like most of the other fur animals, drag the trap to a distance or make violent efforts to escape; it generally lies down until aroused by the approach of the hunter, when it endeavours rather to spring at him than to take to flight.

By the simple snare:—A running-noose of platted sinew, thread or deer-hide thongs, is set in the track that the animal usually follows; this snare is attached to a pole of sufficient weight to toss up the body, and it remains hanging until the hunter passes. The body is sometimes found devoured by crows, wolverines and lynx.

By the medicated cabin:—This is the most efficacious method of catching the lynx. A round enclosure of some three feet in diameter is made of small willows or branches of trees, loosely planted in the snow, and about four feet high. Two entrances are left at the opposite sides, each fitted with a snare. In the centre of the enclosure the medicated skin is placed, inserted in a cleft stick, about eight inches distant from the snow. The snare is more commonly tied to the middle of a loose stick, about 30 inches long by 3 inches in diameter, and which is supported on two pronged branches set on each side of the entrance; when circumstances are favourable the tossing pole is sometimes used, and it is the most certain fashion. The animal on scenting the castoreum inserts its head, or sometimes its fore foot into the noose, which, owing to the long tips on the lynx’s ears, remains securely on the neck when once passed there. After enjoying and rolling itself in the perfume it moves off, but on finding the stick thumping after its heels it becomes alarmed, and makes for the nearest woods; the stick soon catches in the bushes, and in a short time the animal, instead of cutting the line, strangles itself, or, if caught by the paw, remains fixed until the hunter arrives to give it a *coup de grâce*, if he does not find it already frozen stiff. On some occasions it will gain the top of a lofty tree, and on springing off to rid itself, as it fancies, of the stick it hangs itself in a superior manner, and puts the trapper to the trouble of cutting down the tree, which is generally a large one.

As an article of food the flesh of the lynx is highly esteemed, both by the natives and the white residents: it is of a light colour and well-flavoured, the fat, which is soft, like that of the bear, lying mostly on the ribs.

Gray or Strongwood Wolf (*Canis (Lupus) occidentalis*, var. *griseus*).—Size that of a large mastiff dog, but stands rather higher. Hair long, and not coarse; under fur very thick and woolly. Tail very full, but not so long in proportion as that of a fox. Colour varies: in barren grounds variety generally white; in strong wood dark gray. Length, from the tip of the nose to the tip of the tail, about $6\frac{1}{2}$ feet. Weight about 50 lbs.

This is the only species of wolf in the Mackenzie River district; but I am inclined to divide it into two varieties—the dark gray, or the strong wood, and the white, or barren ground. These two are doubtless the same species, though in colouring, locality and habits there is a considerable difference between them.

The general appearance of both varieties of wolf is rather prepossessing, resembling a good deal that of the native dogs. The head is full, broad between the ears, and tapering towards the snout. The legs, though rather long, are stout with good muscular development. The paws are large, furnished with strong claws, and well furred. The teeth are long and white, and the jaws are of immense power. The eyes are placed obliquely, the inner corner tending downwards. The tail is moderately long and very bushy.

The white wolf is found inhabiting the barren grounds and the wooded country bordering on them, its migrations being dependent on the movements of the rein deer, its principal food. This kind of wolf lives in considerable bands, which unite in hunting parties to run down or surround the deer, driving them over cliffs or into rivers or lakes, as is most convenient. In size they are smaller than the gray variety, though much larger than the prairie wolf. Their colour is generally a dirty yellowish white, with most commonly a stripe of gray down the back, but not always.

The dark gray, or strong-wood variety, which I have styled “argentatus,” from the resemblance of its colour to that of the silver fox, inhabits the wooded country. It most commonly is seen alone, but as many as six have been observed in a band. The only specimens of its skin which I have seen were received at Fort Resolution, on Great Slave Lake, and is evidently still rarer among wolves than the silver is among foxes. In its full winter pelage it is a magni-

ficient animal. The colour is a dark silver gray, with a rather browner tint than that of the silver fox; under the belly a bluish black; the nose and paws black. The size of an old specimen is enormous, the skin being as large, when stretched and dried, as that of a barren ground reindeer.

The northern wolf is a very knowing animal, quite as much so as the fox: out of an immense number which I have heard, I will relate a few well-authenticated anecdotes about it, most of which have fallen under my own observation.

In the month of May, when the holes cut in the ice do not freeze up, the fisherman at Fort Resolution, on visiting his trout lines, set at some distance from the fort, discovered that several had been visited; the lines and hooks were lying on the ice, as well as the remains of a partly-eaten trout, and a wolf's track was observed about the place. The fact was that the wolf had hauled up the lines, and helped himself to what fish he required. This occurred again, and then ceased, the animal having been probably driven away by the dogs of the post. I have never heard of a wolf attacking man, though a dog has been carried off from the winter encampment now and then. When there is but a single wolf, one of our hauling dogs, which are a powerful cross between the pointer and native dog, will make a good fight, and often beat off his opponent. The wolf, when taken young, is easily domesticated: it is affectionate and docile to its master, but snappish with strangers, and rather quarrelsome with the dogs. A cross between a male wolf and a domestic bitch makes an excellent breed: the offspring are hardy, docile and strong, easily fed and capable of enduring great fatigue: these hybrids will, contrary to the general rule, have young ones. When there are not too many dogs to drive him off a male wolf will sometimes have connection with a bitch belonging to the fort, but I am doubtful if a female wolf would permit the attentions of a domestic dog. In the copulating season wolves become rabid, at which time their bite is generally fatal to dogs and other animals. Fearful of expatiating at too great a length upon the subject, I will conclude this anecdotary paragraph by a testimony to the sociability of the wolf, even in a wild state. A full-grown wolf remained, during the months of July and August, 1857, quite domesticated, at Fort Resolution: though rather shy of the people it lived in great harmony with the dogs, playing and sleeping with them, and sharing their food: around the smoke made to keep off the myriads of noxious flies from the cattle it reposed with the other animals, and, although there was a small calf in the band, it never attempted mischief. It was shot at by

an Indian and never seen after. Wolves, when pressed by hunger, often come into the square of the fort, and one was shot once when endeavouring to effect an entrance into a meat store.

There are five methods by which wolves are captured or destroyed—by the pitfall, by the gin, by the trap, by the set-gun, and by poison.

By the pitfall:—This method is tolerably successful. A hole about seven feet deep, broader at the bottom than at the top, is dug during the summer: it is covered with twigs and grass, and after the first fall of snow bears the same appearance as the surrounding ground. In the centre of the hole the bait is laid, and on approaching the animal falls into the pit, when he is easily killed.

By the gin or steel-trap:—The trap is set in the usual manner, covered with snow and baited; when caught the wolf struggles violently, and if the trap be not very strong will escape, after which he is very difficult to catch, as he will begin digging at some distance from the trap, which, when reached, he will throw aside with his nose, and devour the bait at his leisure. Once securely caught the wolf will take the bar of wood, to which the trap is fixed by an iron chain, in his mouth, and trot off at a desperate pace, seeking the worst country he can find. I was once obliged to follow a wolf two days in this manner, and only secured him in the end by the aid of dogs.

By the wooden trap:—A large trap of strong pieces of wood is made. First stakes are driven into the earth enclosing a circular space, with two convenient saplings for door-posts, a log of wood or sleeper is laid across the door, at the foot of these, with another longer and lighter piece on the top, for the purpose of being lifted up when set. The roof of the trap is then covered with small sticks and brush, some logs of wood are laid as weights on the upper piece lying across the door, and a strong stake is driven into the ground, to prevent the animal when caught from hauling the top piece off the sleeper. The trap is then prepared for setting; to effect this some of the weights are thrown off, and one end of the top piece lifted sufficiently high to permit a stick about a foot long to be inserted upon the butt of the bait-stick, which is about eighteen inches long, with a piece of fish or meat fixed on the point, and is placed inside the trap. The weights are then replaced, and some pine brush thrown loosely on the top. This fashion of catching wolves is not very successful, except in the fall and beginning of winter.

By the set-gun:—This is a very sure method, though rather dangerous to the hunter, if he do not take great care. The gun is tied upon two saplings or stakes, set on purpose; opposite the trigger is

another thinner stick firmly planted on the ground ; a piece of wood is laid across this stick, one end pressing the trigger, the other attached to a line to the other extremity of which the bait is affixed. This line is carried under the snow by boring holes in pieces of board and passing it through them ; this also prevents the animal from pulling the bait out of the aim of the gun, which he discharges as soon as he hauls upon the line to obtain the meat. Instances have been known of wolves cutting the line close to the trigger of the gun, after which they eat the bait in safety.

By poison :—In this case strychnine is used, which is an infallible method, though the animals sometimes go to such a distance that it is difficult to follow their tracks ; and if a fall of snow come after they have eaten the bait their bodies are often lost. About two grains are required to kill a wolf quickly. But I will defer the detailed account of the effect of strychnine on wild animals until I write the article upon foxes.

Esquimaux Dog (*Canis familiaris*, var. *borealis*) and Hare Indian Dog (var. *lagopus*).—Size of both about that of a pointer. Ears small and pointed. Head broad between ears, and tapering towards muzzle. Colour varied, but whites and grays predominate. Hair long and fine mixed, with thick under fur. Tail long and bushy. General appearance that of a wolf.

In comprising the Hare Indian and Esquimaux dogs among the fur-bearing animals of this district, I am perfectly aware that, in a commercial point of view, they are not included among them ; still, from their wild nature, as well as their long and thick fur, I consider that I may with strict propriety class them in the branch of Natural History upon which these notices treat. I should also wish to point out a few errors into which previous writers on these animals have fallen, as well as to submit to the philosophical world some of the results of my experiments and investigations in this branch of animated nature.

The Esquimaux dog (var. *borealis*) is found, as its name implies, among the Husky tribes of the Arctic coast. It is of considerable size, muscular and well-proportioned. The ears are small and pointed, and with a good breadth of skull between them ; the muzzle is long and sharp ; the eyes are placed at angles, not horizontally ; the fur is deep and thick ; the tail bushy ; the feet broad and well covered ; and the colour is generally pure white, though other shades are not uncommon.

It is said, with what correctness I cannot venture to say, that the

voice of the Esquimaux dog in its native wilds is not a bark, but a long, melancholy howl. I have had several in my possession, all of which barked lustily, but they may have learnt this accomplishment from the dogs of the fort. The similarity of appearance between this dog and the barren ground wolf is very great. It is a hardy animal, capable of enduring great extremes of cold and hunger; but in the latter case it becomes very ferocious, and instances have occurred of children being devoured by it.

There is no want of sagacity in the Esquimaux dog; its whole look tells of its wisdom and cunning. It is very sociable and fond of its master. When two of this breed of dogs begin fighting the whole band light on one of the pair, and if not prevented will tear him in pieces.

The Hare Indian dog (var. *lagopus*) is the race domesticated among the Indians of the Mackenzie River district. It is characterized by a narrow, elongated and pointed muzzle, by erect sharp ears, and by a bushy tail not carried erect, but only slightly curved upwards, as well as by a fine silky hair, mixed with thick under fur. Its colour is tolerably varied in the shades of brown, gray, black and white. Of these tints the darkest are the most rare, a white or grayish white being the most usual shade. Some writers have supposed this animal to be a domesticated white fox, but the thing is highly improbable. The Indian dog, though there are great differences in its size, has on an average more than treble the proportions of this species of fox; moreover, it will not have connection with this or any other branch of the subfamily Vulpinæ, while its varied shades of colour are never seen in the pure white pelt of the arctic fox; with wolves, on the contrary, not only will they cohabit, but will also produce a hybrid offspring that will for several generations procreate one with another. This fact manifests the close connection that both these varieties of dogs have to the wolves, and would almost prove them identical. Thus far I admit, but I do not, for reasons which I shall afterwards give, consider them only domesticated wolves. They are, in my opinion, specimens rather of the parent canine stock unaltered by human experiments, and in appearance such as Adam might have named in the garden of Eden.

With foxes of any description neither these nor any other dogs will copulate. At Fort Resolution I had a very fine pair of cross foxes in confinement: they were kept within a roomy enclosure surmounted with lofty stockades; one of the windows of my dwelling-house commanded this enclosure, and at it I used to spend hours

observing their actions and movements. When the bitch fox went in heat in the spring she had connection with her mate; and wishing to decide upon the extent of the affinity existing between the fox and the dog I shut up a small terrier with her: there was no courtship; the parties were mutually indifferent. I tried Indian, half-Indian and our own hauling dogs, but with no success; they evidently would not enter into a matrimonial speculation, though they were friendly enough. This experiment may perhaps be allowed to decide the case in point.

Wild dogs are known to exist in many countries. The Ajuara of South America, the Dhol of India, and the Dingo of Australia, for instance, all bear a close resemblance to each other and to the Arctic American dogs, in the most essential particulars. Therefore, seeing that wild dogs, as distinct from wolves, exist, it is to some such animal that I am inclined to attribute the origin of the dog. From the earliest ages the dog and wolf have been distinguished from each other, and the varieties to which this article is devoted may have derived their certainly very wolfish appearance from crosses in the breed.

Whatever be the origin of these animals they are of the greatest service—in fact, a necessity—to the aboriginal dwellers in these dreary and barbarous wilds. They are the only beasts of burthen, and although they have not the strength of the fort dogs, still a train or team of three good ones will haul a load of upwards of three hundred pounds, five hundred being considered a good load for the others. Their life is a hard one, far worse than that of a tinker's jackass; a blow or a kick is the usual caress bestowed upon them by their master. Their food is mostly the excrement and offal of the camp—hare-skins and paws, and any other trash too wretched for the far-from-nice stomach of a Chipewayan Indian. I have seldom or ever seen a fat dog among the natives. They make very good hounds to follow deer or moose on the crust of the snow in spring; for, though they have not sufficient strength to bring down these animals themselves, they retard their progress sufficiently to allow the approach of the hunter. I have seen some tolerable retrievers among them also.

I will now conclude this article by offering a just tribute to the affectionate disposition and kindly habits of this poor and ill-used "friend of man." Scanty fare, harsh treatment and want seem to make little difference in his love; and these miserable starvelings show as much, if not more, affection for their hard-hearted and tyrannical master than do the pampered and petted favourites of European old maidenhood.

Common American Fox (*Vulpus fulves*): Red Fox (var. *fulvus*), Cross Fox (var. *decussatus*) and Silver Fox (var. *argentatus*).—Hair long, silky and soft. Tail very full, composed of an under fur, with long hairs distributed uniformly along it. Tail with white tip. Feet and ears black. *Var. fulvus*.—Reddish yellow; back behind grizzled with grayish; throat and narrow line on the belly white; ears behind and tips of caudal hairs (except terminal brush) black. *Var. decussatus*.—Muzzle and under parts with legs black; tail blacker than in the other variety; a dark band between the shoulder, crossed by another over the shoulder. *Var. argentatus*.—Entirely black, except on the posterior part of the back, where the hairs are annulated with gray, this occasionally wanting; tail tipped with white.

In treating on the different varieties of foxes I have spoken of it is extremely difficult to mark the line where one ends and the other commences. During my residence in these regions I have seen every shade of colour among them, from a bright flame tint to a perfectly black pelt, always excepting the tip of the tail, which in all cases is white. Even the judgment of an experienced fur trader is sometimes at fault to decide, in bartering, to which of the three varieties a skin should belong, as they bear different prices. Still, notwithstanding this, I consider these colours to have been produced by intermixture of breed, the different varieties being, in my opinion, quite as distinct as those of the human race; and I do not think that any of the progeny of two pairs of red foxes would be either black or cross. In cohabiting the male foxes accompany the females in bands of from three to ten, much in the manner of domestic dogs: at Durwegan, on Peace River, I have repeatedly observed this. The males fight violently for the possession of the females; many are maimed and some killed. A number of males thus, in all likelihood, cohabit with the same female, which gives rise to the varieties of colour in a litter. Instances are reported as having occurred in which all the varieties were taken in one den, but of this I am rather doubtful. It is very difficult to tell the future colour of cub foxes; the red appear to be cross, and the cross to be silver, which may have caused an error, though I write under correction: I have seen many Indians even mistaken in this; they have brought me live cub foxes for silver, which on growing up proved to be cross. My own theory is that the silver fox is the offspring of two silver parents, the cross of a silver and red, the red of two reds, and the different shades being caused by fresh inter-breeds. Thus two negroes will have neither white nor mulatto

children, nor will two whites have black or mulatto offspring. I do not know whether I have explained my ideas on the subject clearly or not: they are the result of my experience on a subject to which I have given no small attention. I have often robbed fox dens, and have also bred the animals, and the summing up of this part of my subject may be thus made: like colours reproduce like, black and red being origins; the cross is the fruit of intermixture between these shades. I kept a pair of cross foxes in confinement at Slave Lake; their offspring were all cross: I had only one litter when the bitch died.

Foxes are very shy animals and difficult to tame; indeed when old they appear to pine away in confinement; when young they are playful, but at all times rather snappish. They are far from sociable, and generally burrow alone, although it is not uncommon for the members of one family to live together.

The fox-burrow or den is often many yards in length, with various ramifications and side galleries to it, in the centre of which an excavation, rather wider than the passages, serves for the sleeping apartment; to this there are always two entrances, and often more. The den is kept very clean, and in some dozens which I have opened I found neither bones of animals nor offal of any kind. To dig out a fox a flat piece of iron, called an earth-chisel, is tied to a stout wooden handle; the trapper inserts a long slender pole of willow or other flexible wood into the entrance, having stopped up any other that exists, to find the direction in which the passage runs; he then digs another hole and inserts his pole, finding with its point whether any other passage exists, and if so marking the direction. In this manner he proceeds till he digs to where the fox is, who is generally killed in one of the side galleries, or close to one of the closed entrances. This method of killing a fox entails a large amount of labour, as it often takes a whole day to unearth the animal.

Of all the natural gifts of the fox the most remarkable is his exquisite sense of smell. When the fox finds a piece of meat or fish he almost invariably hides it, and returns to eat it at some future period: I have remarked this trait even in cubs which I have reared in confinement, and which used, previous to eating, to dig holes in the snow to bury their food, pushing the snow with their noses to cover it. During the commencement of summer he will lay up a store of the eggs of wild fowl, for his winter's consumption; these he deposits in holes dug in the sand-bars of the river or in beds of moss, and at the expiration of several months will, when pressed by want, visit his *caches*. Even when there are several feet of snow on his deposit he will readily

distinguish the place by scenting his urine, with which a fox invariably sprinkles in a liberal manner all his secret hoards.

This animal is by no means choice in his food: mice, birds, hares, fish, carrion, all come alike to him, and he will even make a meal of a fellow fox if he finds one dead in a trap. In summer a great number of young water-fowl are killed by him, and when musk rats are, by the freezing up of their houses, driven to migrate in the winter, he devours them without mercy.

Respecting any special difference between the three varieties I can see but very little. The cross fox is generally the largest, and the silver fox the most thickly furred. Some trappers profess to know by the shape of the foot whether a specimen be that of a silver fox or not, their idea being that the foot of that variety is more rounded than the others; but I have often seen them mistaken. The foot-prints of a young fox, of whatever colour, have always this appearance, and the foot of the female is more pointed than that of the male. A popular fallacy also prevails among the "winterers" that a silver fox is more cunning than one of any other colour. I imagine the scarcity of the silver variety originated this fancy.

The foxes of this district are generally of a very large size, and I am doubtful if they do not belong rather to the macrourous than the fulvous species.

The foxes inhabiting the barren grounds often present an appearance similar to that of the Sampson fox; the long hairs of the body and tail are wanting, leaving the soft woolly fur entirely exposed in some specimens, and in others partly so, particularly the sides of the thighs. The natives attribute this to their living so much in their holes, which are generally among rocks, and not roaming about so frequently as those inhabiting the wooded country, which often do not visit their dens for weeks together.

The following table shows the proportion of each colour traded in in this district during the last ten years, and will give a very accurate idea of the relative number of each variety:—

Red 6	Cross 7	Silver 2	=	15
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Foxes are most prevalent around the great lakes and on the shores of the Arctic Sea. On the Mackenzie River they are also tolerably numerous, but towards the mountains up the Liard's River they become very scarce.

There are several methods by which foxes are caught and killed, which I will pass in review, detailing those which differ from any

already described:—1, by wooden traps; 2, by gin or steel traps; 3, by set guns; 4, by snaring; 5, by hook and line; 6, by hunting; 7, by unearthing; 8, by ice trap; and 9, by poison. Nos. 1, 2, 3 and 7 have been already noticed, I shall therefore commence with

4. By snaring:—This is not a very efficacious method, and is used only by natives who have not steel traps or gins. An enclosure of twigs is made and the bait laid in the centre, and a snare set in the entrance, with a road fenced in like manner leading to it. The principle of construction is the same as in lynx snaring, and alike in every respect, excepting that the enclosure is larger. Foxes are sometimes found hung in snares set for rabbits.

5. By hook and line:—This cannot be exactly considered a legitimate method of entrapping foxes, though I have seen one killed by it. An Indian at our establishment was visiting and arranging his lines for catching loche (*Gadus lota*), when he observed a fox at a short distance from him regarding his operations; he immediately flung the baited hook towards it, and concealed himself behind a block of ice. Reynard approached, smelt rather suspiciously at the bait, and at length swallowed it, whereupon the Indian, without giving the animal time to cut the line, hauled in and killed it.

6. By hunting:—This method is practised in the fall, before there is enough snow to set the traps. The hunter conceals himself close to the fox's hole, and shoots him as he passes to it.

8. By ice traps:—This is a tolerably successful way, more so than by wooden traps. A block of ice of considerable weight is tilted on end, at an angle of about 45° , a piece of stick supports this, placed well under the block, the lower end resting on the bait. The animal, in his efforts to obtain the bait, drags the stick off the perpendicular, when the ice falls on him and kills him. This method is much used by the Yellow Knives to trap white foxes.

9. By poison:—For this purpose strychnia is used. I have tried aconitine, atropine and corrosive sublimate without success: the two former may not have been pure enough, though I obtained them from the first chemical works in England, and at a very high price. The only poison that I have found strong enough is strychnia. One or two grains of this are mixed with a little tallow, forming a small ball, and covered with a coating of grease outside to prevent the animal from tasting it. A quantity of pounded dried meat and morsels are strewn about, so that the animal after swallowing the poison may be detained a sufficient time for it to operate. The distances which animals go before they die vary greatly; in some instances they fall directly, in others they

run several miles with the same dose arranged in like manner: this I attribute to several causes; to their fatness and to the quantity of food in their stomachs, as lean and hungry foxes die much more quickly than others. The medium in which the poison is given also causes a great difference: when put up in fresh meat a very long time elapses before it operates. Wishing to preserve a specimen of the Hare-Indian dog for the Smithsonian Institution, I resolved to kill the animal by poison: two grains of strychnia of the first strength were administered in a piece of fresh meat; at the end of two hours the animal was as well as ever: I then administered one grain more, mixed with grease; in two minutes the spasms began, and in five the animal was dead. The first symptoms were a restlessness and contraction of the pupil of the eye, and a flow of saliva from the mouth; violent cramps then ensued, the head shook violently, like a paralytic person, the legs were drawn up, and the spine took a circular shape; a lull of a few seconds then ensued, when, after an attack of great violence, the animal died. On dissection the blood-vessels of the head and neck were found very full of black and clotted blood, such as I have seen in the jugular vein of a person who had died of apoplexy; there was no inflammation of the stomach, and the fatal bait was found in the throat entire. Once seen the symptoms of poisoning by strychnia are easily recognised, and I could be certain now of passing a correct opinion on a case of the kind. Dogs take a longer time to expire than either wolves or foxes, the latter dying most quickly; in fact, according to the ratio of the wild nature of the animal who eats it will be the quickness and violence of its death.

Arctic Fox (*Vulpes lagopus*): White Fox (var. *lagopus*).—Smaller than the American red fox. Tail very full and bushy. Soles of feet densely furred. Tip of nose black.

This diminutive fox, which is about as large as a small terrier, inhabits the barren grounds and sea-coast of this district. On only two occasions have I known it to be caught on the south side of Slave Lake, once at Resolution, and once at Big Island. Its fur is thick, about two inches long, white in colour, with the under fur a lead tint. In winter the animal is white all over, excepting the tip of the nose, which is black; a light shade of lead is, however, visible on the shanks and feet; these are densely furred, and the nails are brown. In summer the fur is about an inch in length, white beneath the belly, but owing to the falling off of the long hairs a stripe of plumbeous gray, annulated with white, and about three inches broad, extends from the

nape of the neck to the tail, widening towards the rump, and passing over the tops of the thighs. The whiskers, white in winter, have brown hairs intermixed, and a yellowish tint surrounds the ears, eyes and mouth, and tinges the shanks and feet. A few long dark hairs may be perceived by careful examination sprinkled down the back, and the tail has a slight plumbeous shade mixed with faint yellow. The colour does not approximate in either summer or winter pelage to that of the blue fox, which has been erroneously stated to be the young of the white. The white fox measures, in a good specimen which I have before me, 22 inches from the tip of the nose to the root of the tail, which measures 13 inches to the end of the hairs. It is an extremely stupid animal, easily killed and very tame. It is sometimes knocked on the head in open day, while following the sleds of the Indians. It lives on mice, carrion, birds, especially ptarmigan, to which it is a deadly enemy.

Blue Fox (var. *borealis*).—Similar to the white in every particular except that of colour.

In the lack of positive information upon the subject, I am uncertain whether to consider this as a mere variety of the white fox or to class it as a distinct species, but I will for the present consider it as the former.

The Arctic blue fox measures 35 inches from the tip of the nose to the root of the tail, which is 13 inches in length to the end of the hairs. Its colour in winter is a plumbeous-brown; the under fur plumbeous, and the larger hairs brown at the tips, with white hairs interspersed, but not in great numbers. On the head and nape of the neck the colour is a reddish gray, like the tint of a silver fox in summer pelage. Under the throat down to the chest the colour is nearly a pure chocolate, paling on the belly into a shade similar to that of the back; the sides and flanks are nearly pure plumbeous, mingled with white hairs. The legs are brownish gray, and the fur, which covers the soles of the feet densely, is a dirty white. The claws are nearly an inch long, brown in colour, strong and well curved. The tail is of a like tint with the back, but of a lighter shade. The nose is reddish, with a black tip. The fur is remarkably thick and fine, and the tail very full. In summer pelage it is difficult to define the colour, but it may be called a smoky brown; on the forehead the gray of the winter coat still remains, and there is also a faint stripe of the same shade down the centre of the back. There is less of the reddish tint throughout than in the winter fur.

It has been supposed that the blue fox is the young of the white fox, but this I do not think possible. The specimen now before me is full grown, and in fact it would be a very large animal of the other colour. The colour is also very rare, for while hundreds of white are traded, not more than six, on an average, of the blue are exported yearly from this district. If they were the young of the white the number would be certainly greater. What are traded are all obtained from the Esquimaux inhabiting the sea coast, so that it may justly be termed a littoral animal. On only two occasions, to my knowledge, has it been killed inland, and then at the eastern end of Slave Lake, close to or on the barren grounds; but on inspecting the two animals minutely, so close is their resemblance to one another, except in colour, that I am inclined, in default of more precise information, to class them as varieties of the same species, the blue being a rare one, and holding the same position that the silver does in the fulvous species. An examination of a number of skins would doubtless show shades of colour filling up the intermediate position that the cross fox holds to the other group.

Mustela Pennanti.—Legs, tail, belly and hinder part of back black, the back with an increasing proportion of grayish white to the head. Length over 2 feet. Vertebrae of tail exceeding 12 inches.

This animal is the pecan or fisher of the fur traders. In this district it is not found except in the vicinity of Fort Resolution, which may be considered as its northern limit. In the numerous deltas of the mouth of Slave River it is abundant, frequenting the large grassy marshes or prairies, for the purpose of catching mice, its principal food. In appearance it bears a strong family likeness to both the martin and the wolverine. Its general shape assimilates more to the former, but the head and ears have a greater similitude to those of the latter. It is named by the Chippewayan Indians "Thâ chô," or great martin. Its neck, legs and feet are stouter in proportion than those of the martin, and its claws much stronger. In colour and size it varies greatly. Young full-furred specimens, or those born the previous spring, can scarcely be distinguished from large martins, except by a darker pelage and a less full and more pointed tail. As it advances towards old age the colour of the fur grows lighter, the long hairs become coarser and the grayish markings are of greater extent and more conspicuous.

The largest fisher which I have seen was killed by myself on the Rivière de Argent, one of the channels of the mouth of the Slave

River, about fifteen miles from Fort Resolution; it was fully as long as a fulvous fox, much more muscular, and weighed eighteen pounds. In the colour of its fur the grayish tints preponderated, extending from half way down the back to the nose; the fur was comparatively coarse, though thick and full; the tail was long and pointed, and the whole shade of the pelage was very light and had rather a faded look; its claws were very strong and of brown colour; and, as if to mark its extreme old age, the teeth were a good deal worn and very much decayed. I caught it with difficulty: for about two weeks it had been infesting my marten road, tearing down the traps and devouring the baits; so, resolved to destroy it, I made a strong wooden trap: it climbed up this, entered from above, and ate the meat. A gun was next set, but with no better success; it cut the line, and ran off with the bone that was tied to the end of it. As a *dernier resort* I put a steel trap in the middle of the road, covered it carefully, and set a bait at some distance on each side: into this it tumbled. From the size of its foot-prints my impression all along was that it was a small wolverine that was annoying me, and I was surprised to find it to be a fisher. It showed good fight, hissed at me, much like an enraged cat, biting at the iron trap and snapping at my legs: a blow on the nose turned it over, when I completed its death by compressing the heart with my foot until it ceased to beat. The skin, when stretched for drying, was fully as large as a middle-sized otter, and very strong; in this respect resembling that of a wolverine.

In their habits the fishers resemble the martens; their food is much the same, but they do not seem to keep so generally in the woods. They are not so nocturnal in their wanderings as the foxes. An old fisher is nearly as great an infliction to a marten trapper as a wolverine. It is an exceedingly powerful animal for its size, and will tear down the wooden traps with ease: its regularity in visiting them is exemplary. In one quality it is, however, superior to the wolverine, which is that it leaves the sticks of the traps lying where they were planted, while the other beast, if it can discover nothing better to hide, will *cacher* them some distance off. It prefers flesh meat to fish, is not very cunning, and is caught without difficulty in the steel trap. Fishers are caught by methods similar to those employed in fox-trapping.

Pine or American Marten (*Mustela americana*).—Legs and tail blackish; general colour a deep and rich orange-brown, clouded with black along the back. Head generally light-coloured, with the tips

of the ears and a stripe along the cheeks yellowish white. A broad orange patch is visible on the throat in some; in others this is nearly pure white, and in many entirely wanting. Sometimes, but rarely, the tip of the tail is white. Tail vertebræ about a third of the length of the body, often longer; its outstretched hind feet reach nearly to the end of the tail with the hairs.

The *Mustela americana*, as found in this district, is smaller than the fisher, but larger than the ermine weasels: in its shape it is less muscular, but more graceful than the former of these animals; its head is somewhat depressed, acute, and broader than might be looked for in so lengthened a skull; the ears are slightly pointed and covered densely on both sides with a short velvety fur, overlaid with coarser hairs; the legs are robust, rather short, and clad with a closer and stiffer hair than that on the body; the claws are about half an inch long, not very stout, but sharp, well curved and white in colour; the tail is considerably less than half the length of the body generally, though it is sometimes longer; it is well covered and tolerably bushy. The feet are comparatively large, densely covered with short woolly fur, mingled with stiffer hairs, which prevents the naked balls of the toes from being visible in winter, though they are distinctly so when the animal is in summer pelage.

The winter fur of this species is full and soft, about an inch and a half deep, with a number of coarse black hairs interspersed; the tail is densely covered with two kinds of hairs, similar to those on the back, but coarser; the hairs on the top are longest, measuring two inches and a half, and giving the end a very bushy appearance. The fur is in full coat from about the end of October until the beginning of May, according to locality; when in such a condition the cuticle is white, clean and very thin. From the latter of these dates the skin acquires a darker hue, which increases until the hair is renewed, and then gradually lightens until the approach of winter, the fur remaining good for some time before and after these changes. When casting its hair the animal has far from a pleasing appearance, as the under fur falls off, leaving a shabby covering of the long coarser hairs, which have then assumed a rusty tint. The tail changes later than any other part, and is still bushy in some miserable-looking summer specimens now lying before me. After the fall of these long hairs, and towards the end of summer, a fine and short fur pushes up; when in this state the pelage is very pretty, and bears a strong resemblance to a dark mink in its winter coat: it gradually lengthens and thickens as winter approaches, and may be considered prime after the first fall of snow.

It is difficult to describe the colour of the marten fur accurately. In a large heap of skins (upwards of fifty) which I have just examined minutely there exists a great variety of shades, darkening from the rarer of the yellowish white and bright orange into various shades of orange-brown, some of which are very dark. However, the general tint may with propriety be termed an orange-brown, considerably clouded with black on the back and belly, and exhibiting on the flanks and throat more of the orange tint. The legs and paws, as well as the top of the tail, are nearly pure black; the claws are white and sharp; the ears are invariably edged with a yellowish white, and the cheeks are generally of the same hue; the forehead is of a light brownish gray, darkening towards the nose, but in some specimens it is nearly as dark as the body. The yellowish markings under the throat (considered as a specific distinction of the pine martens) is in some well defined, and of an orange tint, while in others it is almost perfectly white; it also varies much in extent, reaching to the forehead on some occasions; at other times it consists merely of a few spots, while in a third of the specimens under consideration it is entirely wanting.

After minutely comparing these skins with Professor Baird's and Dr. Brandt's description of the martens, and the latter gentleman's paper on the sables, I find that the *Mustela americana* of this district agrees in general more closely with the latter, and am therefore disposed to coincide with that gentleman in his opinion that they are only varieties. The martens of this district bear a greater resemblance to the sables of Eastern Siberia than to the martens of Europe, holding, as it may with propriety be said, an intermediate position. I am also inclined to believe that the various colours found in these regions are simply varieties of the same species, and that the difference, if any, seen in the zib, are merely continental. In summer, when the long hairs have fallen off, the pelage of this animal is darker than in winter; the forehead changes greatly, becoming as deeply coloured as any other part of the body, which is of an exceedingly dark brown tint on the back, belly and legs; the yellow throat-markings are much more distinct at this season, but vary much both in colour and extent, though in only one summer skin are they absolutely wanting; the white edging on and around the ears still remains, but the cheeks assume a grayer tint; the tail is not so full, but from the high North latitude (the Arctic coast) from which these skins were procured, it is still rather bushy. One of the specimens has the dark hairs laid on in thin longitudinal stripes, causing a curious appearance.

Martens are found all over this district, except on the barren ground, to which, as they are arboreal animals, they do not resort; their dens are sometimes excavated, but more frequently are made in a tree. Their principal food is mice, and they are therefore abundant whenever these little creatures are plentiful.

The periodical disappearance of this species is very remarkable; it occurs in decades, or thereabouts, with wonderful regularity, and it is quite unknown what becomes of them: they are not found dead; the failure extends throughout the Hudson Bay territory at the same time; and there is no tract or region to which they can migrate where we have not posts, or into which our hunters have not penetrated.

Martens are caught commonly in wooden traps, baited with white-fish heads, pieces of flesh meat, or, still better, with the heads of wild fowl, which the natives gather for this purpose in the autumn. When they are at their lowest ebb in point of numbers they will scarcely bite at all: Providence appears thus to have implanted some instinct in them, by which the total destruction of their race is prevented. Martens are easily tamed, and look exceedingly pretty as pets. When enraged they utter a sound somewhat like the hissing of a domestic cat.

Common Mink (*Putorius Vison*).—Tail about half as long as the body. The winter colour varies, according to the age of the specimen, from a very dark blackish brown to a deep chesnut. Tail not bushy and very black. End of chin white. Length of head and body about 20 inches. Length of tail with hairs about 10 inches.

In shape the mink resembles an otter, as it also does in the colour and quality of its fur: in size it generally has about the same dimension as the *Mustela americana*. The colour of its pelt varies greatly; in winter its shades range from a dark chesnut to a rich brownish black. The tint of all the body is uniform, except that the belly is sensibly lighter, and that there is a series of white blotches running with greater or smaller breaks from the end of the chin to some distance below the fore legs, and again continued with more regularity from the middle of the belly to the anus; in some skins these markings are of small extent, but I have never seen them entirely wanting; there are commonly spots under either one or both of the fore legs, but not invariably. I have remarked that the coloration of this animal, as well as that of the otter and beaver, grows lighter as it advances in years, and that the white blotches or spots are of greater size and more distinctness in the old than in the young. The fur of a young mink,

under three years, when killed in season, is very handsome; its colour is often an almost pure black; the skin is thin and pliable, approaching nearly to the papery consistency of that of the marten. When aged the hide is thick and the colour more rusty; the summer pelage is short, but tolerably close, and is of a reddish brown colour, and the tail, though still possessing black hairs, shows distinctly the under fur of a decidedly rusty hue. Its feet are rather pointed, and not large; its legs are short, but muscular, and its track in the snow is easily distinguished from that of the marten, whose longer and well-covered paws do not sink so deeply; indeed, when the snow is at all deep and soft, the mink makes a regular furrow, similar to that made by an otter under like circumstances, though of course smaller. Its claws are white, and about half an inch long. The mink is easily tamed, and is exceedingly graceful in its movements. When it locates near a settlement, such as Red River, it is a dreadful destroyer of domestic poultry; in the wilderness it exercises this propensity on birds and water-fowl. It is almost omnivorous, being equally fond of fish and flesh.

The various methods of trapping this animal have been already detailed, and are similar to those employed in the capture of the marten. It is not difficult to catch in steel traps, though rather shy of wooden ones.

I am strongly inclined to the opinion that there is only one species of mink on this continent, and consider it highly probable that the *Putorius nigrescens* of Audubon and Bach is only the common mink under three years of age: I have seen numbers of skins here of exactly the same colour, size and furring as those described under that head in Prof. Baird's work on North American Mammals, which were simply young *P. Vison*. This gentleman also states that the American species of mink never has the edge of the upper lip white: I have never seen the whole of that part so coloured, but in one specimen now on my table there is a white spot beneath the nostrils.

Wolverine (*Gulo luscus*).—The winter colour dark brown along the back. A broad band of much lighter yellowish brown passes from the shoulder downwards along each side to the root of the tail. Forehead, cheeks and nape of the neck gray. A number of yellow, orange or white spots irregularly scattered from the throat to the fore leg. Feet and end of tail black.

The head of the wolverine bears, in colouring and in shape, a strong likeness to that of *Mustela Pennanti*. In general appearance and

movements it greatly resembles the *Ursus americanus*, as well as in the consistency and length of its fur; its walk, however, is not near so plantigrade as that of the latter animal, as is evident from an inspection of the soles of its feet, which are densely covered with hair. The head is broad and rounded, and the nose not so acute as in members of the genus *Mustela*; the eyes are small and far apart; the ears low and rounded, thickly covered on the outside with a long soft fur which nearly conceals them; the whiskers are comparatively short, stiff and not numerous; and there are over each eye sparse tufts of similar hairs.

The body is long and stout, of great muscular power, and formed more for strength than activity. The feet are larger in proportion than those of any other species of the subfamily *Martinæ*, and are armed with strong claws, well curved and more than an inch in length.

The skin which I propose now to describe is that of a female killed in last March: it is that of an average sized animal, whose coloration also is of the ordinary shades, and may be accepted with great propriety as a type of the species as found in this district. The pelage in winter is formed of a soft woolly under fur, tolerably fine and about an inch deep and overlaid by larger and coarser hairs, which are about three inches long on the rump, but shortening gradually towards the head, where they measure only half an inch. The feet are large and broad, the hind feet larger than the fore feet, and all densely covered with mingled fur and hair, about three-fourths of an inch in depth; the balls of the toes are naked, but from the thickness of the coverings of the feet they leave no impression upon the snow; by careful examination three additional small bare pads will be discovered on each foot; the nails are strong, sharp, well curved, white, and upwards of an inch in length, those of the fore feet being, if anything, the stronger, though there is little difference either in length or shortness. Comparatively speaking the tail is rather short, very bushy, particularly towards the end, which has the appearance of a piece cut off; the fur covering it is of the same kind as that on the body, but the under fur is not so thick, and there are more of the coarse hairs, which are here from five inches long at the root to six at the tip. The colour of the fur varies much, according to the season and age; the younger animals are invariably darker in the shadings than the old, which exhibit more of the gray markings. In the specimen under consideration the back from the nape of the neck to the rump is a dark blackish brown, perceptibly lighter on the neck and shoulders. From the fore leg a stripe of yellowish brown, about three inches broad, sweeps round each side,

and growing lighter as it proceeds, passes over the tops of the thighs and ends at the root of the tail, giving the back of the animal almost the appearance of an Esquimaux's tunic or shirt; and it is possible that these people may have borrowed their fashion from the wolverine, whose fur is greatly in request among them. The colours of the head are thus arranged: from the nose to between the eyes and around them the hair is very short, and is almost quite black; the forehead, ears, cheeks and nape are of a brownish gray shade, which gradually changes as it meets the darker tints and longer fur of the body; from the chin to the fore legs along the throat a black stripe of varied breadth extends, broken with large blotches of white or orange-yellow; the belly is of the same shade as the back until near the anus, where a spot of bright orange-yellow hairs extends to about four inches; the root half of the tail is light yellowish brown, and the top mostly black without any mixture of white hairs.

The legs and feet are black; there is a yellowish spot on the inner side of the fore legs about half way down, and the fur of the soles is of a light brown tint; the summer pelage is of a light colour, coarse and thin. In some specimens the yellowish fringing of the sides and rump is almost entirely white and of larger extent, leaving but a narrow stripe on the centre of the back dark: in such the hoary markings of the head would be of greater extent, and descend most probably to the shoulders.

In examining the skull of the wolverine the most striking points are the shortness and broadness of its muzzle and the roundness of the cranium, giving promise of a certain quantity of reasoning powers, which the nature and habits of this animal do certainly not belie. The entire structure is massive, the skull and bones are thick and ponderous, and the muscles of the neck and limbs of immense volume; indeed every requisite is apparently united to form a beast of extraordinary strength, and I do not wonder now at the almost fabulous feats, considering its size, that it has performed.

The habits and food of the wolverine are similar to those of the marten; it hunts birds, hares, mice, and will also occasionally kill disabled animals of the deer kind; but its greatest notoriety arises from the mischief which it does to the *câches* of meat and trapping roads, both of the natives and white residents. The strongest *câches*, built of green logs, and a foot in diameter and dove-tailed, it will manage to effect an entrance into: after satisfying its hunger it is not yet contented, but carries off the remainder of the pieces of meat, even those weighing upwards of 100 lbs., transporting them to some distance

and burying them in the snow. By following the animal's foot-prints those hidden stores can be recovered, but in general quite uneatable, as the wolverine, to protect its secret hoards from the attacks of other beasts of prey, besprinkles all his larder plentifully with his urine, which has a strong and most disagreeable odour, and proves a good preservative in most cases. But the desire for accumulating property seems so deeply implanted by nature in this animal that, like tame ravens, it does not appear to care much what it steals, so that it can exercise its favourite propensity to commit mischief. An instance occurred within my own knowledge in which a hunter and his family, having left their lodge unguarded during their absence, on their return found it completely gutted; the walls were there, but nothing else: blankets, guns, kettles, axes, cans, knives, and all the other paraphernalia of a trapper's tent, had vanished, and the tracks left by the beast showed who had been the thief. The family set to work, and by carefully following up all his paths recovered, with some trifling exceptions, the whole of the lost property. The damage which it does to a trapping road is very great; indeed, if the animal cannot be killed, it is as well to abandon it, as he will not only break the traps and eat the bait or animals caught, but also, out of sheer malice, will carry away the sticks and hide them at some distance. To kill or catch it is very difficult: an old stager is a regular bugbear to the Indians. "Master," said one to me in his own language, "I can't hunt furs; the wolverine eats the martens and baits, and smashes my traps; I put a steel trap for him, he got in, but released himself by screwing off the nuts confining the spring with his teeth. I set a gun; he cut the cord attached to the trigger, ate the bait, and broke the stock. What shall I do?" As the infallible strychnia had not then made its appearance in these parts I could offer him neither advice nor assistance, and but little consolation.

American Otter (*Lutra canadensis*).—Length about $4\frac{1}{2}$ feet. Muzzle longer than wide, sending down a naked point along the median line of the upper lips anteriorly. Under surfaces of the feet so covered with hair towards the circumference as completely to isolate the naked pads of the tips. A hairy strip extending forward from beneath the carpus on the palm. Colour above liver-brown, barely lighter beneath; inferior surface and sides of head dirty whitish.

In appearance the otter is a magnified mink: its walk, fur and colour bear strong similitudes to those of the latter animal, and the lightening of the tints of the pelage in old age is the same in both. Its fur is

short and thick, the under fur being of a silvery white shade, slightly waved and silky, and of similar texture to that of the beaver, but not so long. The colour of the overlying hairs varies from a rich and glossy brownish black to a dark chesnut. In summer the colour is a rusty brown and the fur is shorter and thinner. The habits of the otter are aquatic: from the shortness of its legs its motions on shore are not so quick as when in the water, and, as its food is principally fish, it resides in winter near some lake or river, where it keeps a hole open in the ice all the season: during this period of the year its migrations on land are toilsome, and it leaves a deep furrow or path in the snow, which, when seen by the trapper soon after the animal has passed, invariably leads to its destruction. If a trap be set on this road the otter is nearly certain to be caught, as it has a strong objection to opening new paths through the deep snow. In firing at an otter in the water care must be taken not to shoot it in an immediately vital part, as, if death ensues instantaneously, the body will sink like a stone.

Whether the *Lutra californica* be found in this district, or whether that animal be only a variety of the species under consideration, I cannot say; but an examination of a greater number of specimens will in time determine the matter.

White Thrushes.—My birds, which are snow-white, were hatched this year, in this immediate locality. The first nest, which was hatched the first week in April, contained four birds, one of them white, the other three of the usual brown colour. This white bird (a male) has now completed his moult. The second nest (hatched May 24th), had only three birds; all three are white. The third nest (hatched June 28th) had four birds, one of them white, two brown, and one brown with the tail and wing-feathers tinged with white. I am anxious to find out whether, if there have been any other white birds, they have turned out males or females. I believe mine are all males. During the severe thunderstorm we had some six weeks ago, two of the birds, which happened to be in a cottage, in cages near the window, were in some way affected with the lightning, one of them in a most extraordinary degree. Its nerves were evidently affected, and whenever the atmosphere was lowering it would sit down and gasp most violently, and its heart would be distinctly perceived throbbing. This occurred whenever rain was imminent, and then it might be caught without the slightest fluttering. So constant were these attacks, and so weakening to the bird, that I had it killed. Its beak also was twisted a little. The other bird was not affected to anything like its fellow. Its eyes were affected, and now, at times, the under lashes are a little distorted. During the same storm several bullfinches, canaries and nightingales, in the same cottage, were either affected in the same manner, or were killed at once.—*John Marshall; Belmont, Taunton, September 10, 1861.*

Destruction of Small Birds, &c.—When I stated (Zool. 7707) that the nightingale was becoming rare, or to use my precise words, “fast disappearing,” as a matter of course I was referring only to this county (Cambridge). I am delighted to find by Col. Newman’s communication (Zool. 7740) that this bird is gaining ground in localities where it was previously unknown. I hope to see similar records from other parts of the country. His paper recalls to my mind the sad and ruthless destruction of other tenants of the land and sea: I refer to the merciless shooting of various species of gulls, terns, phalaropes, &c., by sportsmen. Thousands in the course of every year are winged, broken-legged, or retire to some hidden nook to pine out, with horrible pain, their dying moments.—*S. P. Saville; Dover House, Cambridge, October 14.*

Occurrence of the Gray Phalarope (Phalaropus platyrhynchus) near Southampton.—Mr. J. Harrington kindly brought for my inspection a fine specimen of the gray phalarope, which he obtained from a man who had shot it at the mouth of the river Humber, near Southampton, on the 24th of September last. As is usually the case with this species, it was comparatively tame, allowing of a very near approach. Upon dissection I found its craw to contain a quantity of partly decomposed remains of a species of Hydrometridæ, probably *Velia rivulorum*, but they were in such a half-digested state that it was almost impossible to determine them. It had nearly completed its autumnal moult. Sex male.—*Id.*

Occurrence of Richardson’s Skua (Lestris Richardsons) in Cambridgeshire.—The other day a man brought me a fine-marked immature Richardson’s skua, which he informed me had been taken in an exhausted state by a labourer at work in a field in Cottenham Fen, Cambridgeshire, on the previous afternoon (Sept. 16). It is in that state of plumage so admirably delineated in Yarrell’s ‘British Birds;’ if possible, this example presents more diversity of spots and markings than the figure in that work.—*Id.*

*Nesting of the Redtailed Tropic Bird: a Visit to Round Island.**—Round Island lies about twenty-five or thirty miles north-east of Mauritius, and is about a mile and a half long by a mile wide. The land rises at once from the sea to the height of about a thousand feet, and is consequently very steep. Here the redtailed tropic bird (*Phaëton rubricauda*, Bodd.) breeds in very large numbers. They are the tamest birds I ever saw, and do not know what fear is. They never attempt to leave their single egg or nestling at one’s approach, but merely stick out their feathers and scream, pecking at one’s legs with their beaks. It is the fashion on the island for visitors to remove the old bird from its egg by a slight shove, and then, placing the foot gently on its head, to draw out the long tail-feathers. It resents this insult by screaming and snapping, but never tries to escape by flying or shuffling along the ground; in fact, like all birds which have their legs placed so far behind, they cannot rise off a flat surface, but require a drop of a few feet to give them an impetus. One that had an unusually tight tail I lifted up and held in the air by that appendage, and it flapped in my hand until the feathers gave way, when it flew off, but having left a young one behind, returned almost to my feet in two minutes or so, as if nothing had happened. They do not appear at all particular in the choice of a place to deposit their single egg. They make no nest; but the shelter of an overhanging rock, or the protection of the arched roots of the *Vacoa* (a species of *Pandanus*), seems preferred. On one occasion I found an old lady asleep on her egg, and she was extremely indignant at being

* Reprinted from the ‘Ibis’ for April, 1861, and kindly communicated by the author.

stirred up and having her tail stolen. It is curious that I did not see a single egg without its owner sitting on it, and perhaps one may hence presume that they feed at night. In some places their nests were excessively numerous, their eggs or young occurring every few yards. There were to be found about as many young as eggs, some of the former almost as large as their mothers, and nearly able to fly; but I did not see a single immature bird that had started in life on its own account, though I have no doubt many had already done so. Most of the eggs had been incubated some time. In fact, on blowing fifty or so of them, I hardly think that I found half a dozen fresh, the majority being within a few days of hatching. I was rather short of baskets for carrying eggs, and consequently I did not get as many as I might have done. Certainly I had been told that the eggs might be picked up by the thousand, but I had not believed the statement. This species is much finer and larger than the yellowbilled one (*P. flavirostris*, Brandt.) Of this there were a few about the island; but I did not find a single egg, or see a bird on the ground. When on the wing, the fine rosy colour suffused over the whole under surface of the redtailed species comes out very well.—*Edward Newton.*

Occurrence of Chelonia caretta in Britain.—I had an opportunity of examining the turtle referred to by Mr. Edward (Zool. 7713) as having been got at Pennan, immediately on its arrival in Aberdeen, when it was in a very lively condition, and weighed 25 lbs., no great weight certainly for the species to which this individual belongs. It is the *Chelonia caretta*, not *C. imbricata*, and may therefore be considered an addition to our fauna, so far, at least, as mere stragglers can be considered such. This, with the two other species already described as having been found on our coasts, is described and figured in Cuvier's 'Règne Animal,' and may be easily recognised from its fifteen dorsal plates, serrated jaws, and heart-like outline. Dr. Dyce has fully described this individual in the 'Annals' for October, where there is also a notice of another specimen having been got on the banks of Loch Lomond,—a most extraordinary occurrence certainly, though we must not forget that it might have possibly made its way to this spot from the sea. It appears a very singular circumstance that no less than three turtles should have been procured all about the same time, and all probably of the same species; it would be somewhat difficult to suggest the likely cause of this, though this is a point of some interest and deserves investigation. I am somewhat disposed to believe that in some of the instances recorded by Fleming of the capture of *C. imbricata* this species (*C. caretta*) may have been intended.—*W. Sutherland; Aberdeen, October 7, 1861.*

Colias Edusa.—Whilst riding across Durdham Downs yesterday (September 24th) I saw what appeared to me to be a specimen of *Colias Edusa*. Although I have seen great numbers in clover and lucerne on the south coast in August, I am not aware of one being captured in this locality during an experience of more than twenty years. I therefore almost doubted my eyes, and determined, if possible, to become better acquainted with it. Not being provided with net or forceps, I had some difficulty in getting near, but eventually succeeded, whilst holding my horse with one hand, in securing my prize between the finger and thumb of the other. It proved to

be a fine female specimen of *Colias Edusa*.— *Andrew Lighton ; Clifton, near Bristol, September 25, 1861.*

Colias Edusa and Acherontia Atropos at Launceston, Cornwall.— On the 5th ult. I had a fine specimen of *Acherontia Atropos* brought me, captured in a room in this town. *Colias Edusa* has also made its appearance here: the first I saw on Sunday, the 18th of August, but within the last day or two my children have captured six specimens in fine condition, viz., four males and two females. They also saw many more which escaped their nets.— *W. H. Hayward ; St. Thomas, Launceston, Cornwall, October 3, 1861.*

Description of the Larva of Eupithecia subfulvata.—Var. 1. Reddish brown. Central dorsal line pale olive, connecting a series of perfectly oval dusky olive blotches, which become confluent on the anterior and posterior segments. Subdorsal lines blackish, interrupted, dark opposite the dorsal blotches, pale and almost if not quite evanescent between them. Median dorsal blotches pale in the centre, very close together, almost confluent. Spiracular line white. Back thickly studded with minute white tubercles, and less thickly with whitish hairs. Belly whitish, with a purplish central line.

Var. 2. Ground colour pale yellowish brown. Markings similar to var. 1.

Feeds on leaves, flowers and seeds of *Achillea Millefolium*. In November, 1860, I took upwards of eighty larvæ on this plant in Bucks: some I sent to Mr. Hellins, the rest I kept myself. From June 21st to July 31st I bred about thirty moths, all true *E. subfulvata*. In two instances the bluish gray and red of the anterior wings was suffused in patches on the disk, but with this slight exception the thirty insects did not vary at all. I have, with some slight alterations, reproduced my description of the larva of *E. subfulvata* (Zool. 6817), thinking that it may facilitate a comparison of the distinctive characteristics of the two larvæ.— *H. Harpur Crewe ; The Rectory, Drayton-Beauchamp, Tring, August 30.*

Description of the Larva of Eupithecia succenturiata.—Var. 1. Dull dark reddish brown. Central dorsal line dingy black, connecting a chain of dull black, inverted kite-shaped blotches, which become confluent on the anterior and posterior segments. Subdorsal lines dusky, slender, waved, uninterrupted, darker between the dorsal blotches. Median dorsal blotches at some distance from each other, border generally pale, centre dusky. Spiracular line dirty white, interrupted. Head bordered by a reddish line. Belly dusky at the edges, pinkish white in the middle. Central ventral line blackish. Back and sides sprinkled with a few reddish hairs. General appearance dingy.

Var 2. Pale reddish brown. Central dorsal line and blotches dingy olive. Subdorsal lines dusky, very indistinct. In other respects resembling var. 1.

Var. 3. Ground colour dark, dingy olive. In other respects like var. 1.

Pupa enclosed in an earthen cocoon, resembling in most points that of *E. subfulvata*. Some four years ago I met with this larva on the banks of the Stour, near Ipswich, Suffolk, feeding on leaflets of *Artemisia vulgaris*. I left the locality immediately afterwards, and, being unable to obtain a fresh supply of the food-plant, they all died. Last autumn my friend Mr. Hellins sent me some larvæ which he had taken on the same plant near Exeter, and I immediately recognized them as being the same as those I had previously found in Suffolk, and from these Exeter larvæ the foregoing descriptions were taken. I have now very great pleasure, at his request, in publishing them in the 'Zoologist,' and thus adding a link to the long chain of evidence by

which he has so satisfactorily proved that this species is entirely distinct from *E. subfulvata*.—*H. Harpur Crewe*.

Note on Eupithecia succenturiata and E. subfulvata.—Last autumn, in a locality where *E. succenturiata* had been previously taken in the imago, I beat from mugwort (*Artemisia vulgaris*) a number of pug larvæ. Several of these were plainly *E. absinthiata*, but the greater number reminded me at once of the larvæ of *E. subfulvata*, which I had reared from the egg a season or two before. Having no notes or figure to refer to, I could not myself decide how far the resemblance extended, or where it failed; but on my sending some of these mugwort larvæ to Mr. Buckler, who I knew had figured *E. subfulvata*, he at once wrote to say that he had compared them with his figures (life size and magnified), and found them decidedly distinct. This announcement caused me to send batches of them to others of my friends, including Mr. Doubleday, Mr. Crewe, Mr. D'Orville, and Mr. Batty of Sheffield, and at the



Eupithecia subfulvata.



Eupithecia succenturiata.

same time set me collecting, for comparison, all the pug larvæ I could find in my own neighbourhood feeding on yarrow (*Achillea Millefolium*): some yarrow-feeders were also sent me by Mr. Crewe and Mr. Batty, and all these (though found in three such distant localities as Exeter, Sheffield and Drayton-Beauchamp, and varying somewhat among themselves) could be distinguished from the mugwort-feeders, both by their colour, and the form of their markings. Our hopes therefore of breeding *E. succenturiata* rose high; nor have they been disappointed: this summer, in June and July, myself and friends have bred from the mugwort larvæ upwards of thirty moths, which, with ten others bred by Mr. Norcombe, who collected the larvæ for himself, make a total of more than forty, every one of which was the typical *E. succenturiata*, having the central space of the wings white; whilst from the yarrow-feeders we have bred some eighty moths, every one of them *E. subfulvata*, brown and gray without any white. From mugwort more than forty *E. succenturiata*, and not one *E. subfulvata* or *E. cognata*; from yarrow eighty *E. subfulvata*, and not a single typical *E. succenturiata*. Both species vary indeed in the colour of the dark border of all the wings. I bred both of them with reddish brown borders, instead of the more usual blackish gray, but in every case the colour of the central space (except of course where traversed by strigæ) was a beautiful pure white in *E. succenturiata*, and in *E. subfulvata* brown or brown and gray. When to all this I add that their cages were kept side by side, and treated precisely in the same way (nearly all the specimens of *E. succenturiata* had emerged before *E. subfulvata* began to appear) I think the evidence in favour of their being distinct species, and not merely varieties of the same, is tolerably conclusive. Mr. Doubleday I know regards it so, and I understand that M. Guenée agrees with him.—*J. Hellins; Exeter, September 16, 1861.*

Description of a Geometer probably hitherto uncharacterized.—

EPHYRA ? DECORARIA, Newman.

About the size of *Ephyra porata*. Fore wings with the costal and hind margins bluish lead-colour; disk of the wing tinged with delicate red, inclining to rosy: two very distinct pale gray transverse waved lines, one of them short and situated at one-fourth of the distance between the base of the wing and its hind margin, the other twice the length of the first and situated at three-fourths of the distance between the base and hind margin: near the centre of the wing, but nearer the costal than the inner margin, and exactly intermediate between the two transverse lines I have described, is a conspicuous white spot transversely elongate. Hind wings nearly the same colour as the margins of the fore wings and almost without any tinge of red, and having two transverse waved lines and a central white spot, nearly corresponding in character and position with those on the fore wings; cilia pale gray, corresponding in colour with the transverse lines. Antennæ setaceous. Head, thorax and body gray lead-coloured. For the loan of this exquisitely beautiful moth I am indebted to Mr. Shroobree, who bred it in June last, from a larva which he found in May, feeding on the bedeguar of a wild rose: he describes the larva as green, with a purplish median stripe down the back. I am induced to give this moth a name from a knowledge of the readiness with which experienced entomologists will kindly point out a previous description when a species has been redescribed in error, although innate modesty might have prevented their giving an opinion when the same insect was submitted to their examination. This species, I may hint, is somewhat like the *Phalæna albicinctata* of Haworth, whose description will do pretty well as regards the markings, but the colour is totally different. "*Alis nigris, singulis puncto medio, strigaeque juxta marginem posticum communi albis.*" The specimen is described by Haworth as being in the late Mr. Hatchett's collection, which subsequently came into the possession of Mr. Ingall.—Edward Newman.

Description of the Larva of Semyra venosa.—Head scarcely so broad as the body; body of uniform breadth, warty, hairy, but without humps. Head shining black, having a whitish spot just above the mouth, and a conspicuous pale yellow V-shaped mark on the face, the apex of the V pointing towards the epicranium; the cheeks are also adorned with paler markings: ground colour of the body velvety black, each side having two parti-coloured longitudinal stripes; of these the upper or subdorsal stripe is composed of a series of amorphous blotches or markings, alternately white and orange-coloured, the whiter markings occupying the junctions of the segments, the orange markings occurring between them; the lower stripe on each side occupies the spiracular region, and includes the spiracles; like the upper stripe it is irregular, interrupted, and composed of the same colours, white however predominating; in these stripes are seated the warts, mostly orange-coloured, and each emitting a sparse fascicle of black and white bristles; on the second segment is a fringe of bristles of various length and colour, projected over the head: belly whitish gray; legs blackish at the base, flesh-coloured towards the tip, each having one black terminal claw; claspers flesh-coloured. For a specimen of this beautiful larva I am indebted to Mr. Brown, of Cambridge. It feeds on *Cladium Mariscus*, *Arundo Phragmites*, and several of the coarser grasses. When full fed it cuts a number of the smaller blades of the grasses on which it happens to be feeding, into lengths of an inch or an inch and a quarter, and then spinning a cocoon, generally between two principal stems

of the grass or reed, although *sometimes* attached only to one, it covers or thatches its habitation with the smaller pieces, leaving no part of its silken shroud visible: this thatched domicile is rather smaller at both ends, or shuttle-shaped, and is suspended perpendicularly: in this it passes the winter, and the perfect insect emerges the following June. These larvæ are peculiarly liable to parasites, both dipterous and hymenopterous; the dipterous is a large species of *Tachina*, allied to *T. nigripes*, but I think hitherto undescribed. In our present very imperfect knowledge of the affinities of Lepidoptera, now being for the first time investigated in France by M. Guenée, it is extremely difficult to assign to *Semyra* its natural position: Guenée places it at the end of the Bombycoideæ and immediately before the Leucanidæ. The larva of *S. venosa* appears to have greater similarity to the Ursinæ than to those of the Bombycoideæ, and the French lepidopterist himself observes that "the young larvæ may easily be confounded with those of *Arctia*." The wings of the imago are strongly lined, like those of *Leucania pallens*, in a longitudinal direction.—*Edward Newman*.

Capture of Noctua ditrapezium near Portsmouth.—This rare species was taken, in the early part of the summer, near Portsmouth, by my brother, the Rev. H. Matthews, and also by a friend of his in the same locality.—*A. Matthews; Gumley, Market Harborough, October 21, 1861*.

Second capture of Margarodes unionalis near Torquay.—On Saturday, the 5th of October, I took a specimen of *Margarodes unionalis* not far from the spot where I imagine Mr. King took his, two years ago. Mr. Terry, another collector here, was with me when I took it. It is in very fine condition, and answers exactly with the figure in the 'Annual' for 1860.—*R. M. Stewart; 3, Park Place, Torquay, Devon, October 8, 1861*.

Captures of Lepidoptera near Dublin.—As I expect to leave Dublin in a few days, I forward a few notes of my most remarkable captures in the neighbourhood during the last season:—

Lithosia caniola. This species occurred sparingly in sheltered spots on the coast in the middle of August: it was over in fourteen days from the appearance of the first specimen. It flies gently at early dusk, and is partial to the flowers of ragwort and *Galium verum*. A female laid a lot of eggs, and the larvæ are feeding in the cages of a friend, but, as they evidently hibernate, grave fears are entertained that they will not survive the winter.

Agrotis obelisca. This species is not rare here, frequenting ragwort bloom in August and the beginning of September. It is singular that, as far as I know, this is its only intermediate locality between Edinburgh and the south coast.

Agrotis agathina. I have at last discovered this lovely species in Ireland: a few specimens occurred at heath bloom, on the coast, in the beginning of September.

Dianthœcia capsophila. This species occurred again in June, both at light and hovering at flowers, on the cliffs, but only in small numbers: it appears to be scarce even in its very restricted localities. I looked for the larva among *Silene maritima* and found some, different from all our known species, which would probably produce it, but they were so tender that only one or two have entered the pupa state, so that the chance of rearing it is diminished considerably. Singularly enough, I also found larvæ of *Dianthœcia Cucubali*, a species not before known to occur in Ireland: they fed up well enough.

Peronea permutana and *P. aspersana*. These local species were not rare among plants of *Rosa spinosissima*, on the coast, in August.

Sericoris littorana. I was surprised at the appearance of a second brood of this species in September, all of the true Irish type, light ground-colour, with rich dark markings, and some finer than any of the summer brood.

Dicrorampha consortana. Scarce, in August, on a little spot of limestone soil on the coast, the exact spot where *D. acuminatana* and *D. senectana* occur.

Eupæcilia dubitana. Excessively local on the cliffs in June; generally hiding among furze.

Eupæcilia atricapitana. Widely distributed along the coast, occurring both on cliffs and sand-hills, and lasting from the middle of June to the middle of August, but rare. I never saw more than one specimen in a day.

Tinea confusella. Rambling along the cliffs on the coast, in August, I noticed a little *Tinea*, pretty common, flitting about and running up the grass stems like an *Elachista*. This has been identified by Mr. Stainton as *Tinea confusella* of Herrich-Schæffer, new to Britain and rare on the Continent, and occurring on rocks near Vienna.

Plutella annulatella. This species abounds under the cliffs close to the sea, but larger and much more richly marked than English specimens. Singularly enough I took the English form on sand-hills at only a few miles distance.

Depressaria capreolella. A few specimens have occurred on the coast. In August they come occasionally to ragwort bloom at dusk; in April, after hybernation, they fly in the afternoon over furze bushes.

Depressaria nanatella and *D. rotundella*. These two species occur together not uncommonly along the coast, in August and September. They are fond of the flowers of ragwort, thyme and *Galium verum*.

Gelechia vicinella. Scarce among *Silene maritima* on the coast, at the end of August.

Gelechia leucomelanella. This species, which has, I believe, hitherto only been taken at the Lizard, in Cornwall, also occurs among *Silene maritima*. It appears to be not nearly so active as most of the *Gelechiæ*, and generally falls down when beaten from its concealment, and allows itself to be captured.

Gelechia coronillella. This inhabitant of the "hilly field" at Headley Lane has turned up here on the limestone upon the coast, in August.

Gelechia Tarquiniella. This little gem, new to Science, and indebted to Mr. Stainton for a name, has habits similar to those of *G. pictella*, which it resembles. It occurs on the sand-hills, in warm hollows among moss, *Galium*, &c., in June, and cannot well be seen, much less captured, without lying down, when it is only to be secured by sharp practice with a pill-box.

Ecogenia Kindermanniella. This species is said, in the 'Manual,' to occur in houses: I beat it out of furze-bushes in August, in company with *Depressaria costosa* and *Gelechia instabilella*.

Coleophora olivaceella. I took a few specimens flying on the cliffs in the evening, at the end of July.

Oinophila V-flava was very common in June, in damp warehouses where the walls were covered with thick mould and fungus. — C. G. Barrett; 30, Parkgate Street, Dublin, September 29, 1861.

Description of a Tortrix new to Science.—

EUPÆCILIA ALBICAPITANA, Cooke.

Head, face and palpi white. Antennæ gray. Anterior wings white, with a dark gray spot near the middle of the costa, a smaller one between that and the base of the

wing, and a still smaller one at the apex ; opposite the middle spot is another dark gray spot on the inner margin, extending across the wing, nearly joining the one on the costa, the space between the spots being speckled with dark gray, so as apparently to form a dark gray band across the wing, broadest on the inner margin. A light drab-coloured striga, dark gray on the costa, runs from near the apex to the anal angle, and between it and the middle of the wing is an oval spot of the same colour. Cilia white, speckled with dark gray. Posterior wings dusky. Expanse of wings eight lines. I captured this insect on the Hill of Howth, about the 20th of June, 1857, and felt convinced at the time that it was undescribed, but did not think it desirable to name it until more specimens had been taken. Since then I have ascertained that some specimens have been taken on the Cheshire coast, both by Mr. Gregson and Mr. Greening ; and this season it has been taken in the same locality where I found it four years since. It is more like *E. dubitana* than any other species, but is sharper-winged, larger and lighter-coloured, especially near the apex of the wing.—*Nicholas Cooke*. [*Read before the Northern Entomological Society*.]

Notes on a Species of Lithocolletis bred from Cherry-leaves.—In the middle of September I found, in a garden at Exeter, several mines of a *Lithocolletis* in the leaves of a *Morella* cherry tree trained against a wall. These travelled about with me for about ten days, and a few days after my arrival at home two perfect insects made their appearance,—a rather unusual occurrence, as at that time most of the second brood of *Lithocolletis* larvæ should have been feeding. Now, according to the views entertained by some entomologists, and chiefly by one gentleman of high standing in the science, these should be *L. cerasicolella*, a species that has not yet been found in this country, and which on the Continent mines in *Prunus Padus*, and belongs to a section of the genus, the species of which mostly affect trees or shrubs of the order *Rosaceæ*. But the insects are not *L. cerasicolella* ; they are in fact *L. torminella*, typical and unchanged in any way ; and this I consider as additional proof of the stability of the latter as a species. *L. torminella* feeds naturally on *Sorbus torminalis*, and as this shrub is closely allied to the wild apple, and as the insect is also closely allied to *L. pomifoliella*, which feeds on the latter tree, here is a good opportunity for testing the theory that difference of food may cause differences in the perfect insects, so great as to cause some entomologists to consider them distinct species ; but that food does cause such differences is, I think, clearly disproved in the present instance. *Pyrus Malus* is more closely allied to *Sorbus* (*Pyrus*) *torminalis* than is *Morella* cherry to the latter species ; and so, allowing that food may cause variation, the perfect insects from the cherry should have been more distinct from *L. torminella* than that species is from *L. pomifoliella*, and perhaps should have been *L. cerasicolella*. The result I think shows the fallacy of the theory. I have before promulgated my views on this subject, and pen these remarks in no party spirit ; but the facts here referred to appeared to have so strong a bearing on the matter that I could not resist recording them.—*R. McLachlan* ; 1, *Park Road Terrace, Forest Hill, October 10, 1861*.

Pupa of a Limnobia enclosed in a Jelly-like Substance.—In a pond near Rainhill I lately found the pupa of a Dipterous insect, enclosed in a wrapper of jelly, so pellucid that when transferred to a glass of pure water it was scarcely visible. The jelly was five or six times the thickness of the enclosed pupa, and quite firm. In a few days the transformation took place, and the insect proved to be a *Limnobia* ; I am not certain of what species.—*Henry H. Higgins*.

Economy of Cecidomyia Taxi.—When I was in Surrey, in January last, I noticed that the yews that grow intermingled with junipers on Riddlesdown, near Croydon, were covered here and there with tinted bosses, which had a very pretty appearance. I gathered several, in the hope that I might be able to find out the insects that had been instrumental in forming these artichoke-like galls. The galls I kept in my botany-case for many weeks, but unfortunately the larva died in its nidus of leaves, and I was thus disappointed. More recently, however, I observed the same bosses on yew trees in Yorkshire, and as May was nearly over I thought it not unlikely I might succeed better at a season when so many of the *Cecidomyiæ* make their entrance into life. I gathered a handful of affected shoots, put them into a cup of water, and covered them over with a bell-glass. This time I was rewarded for my perseverance. The first day of June I had the pleasure of seeing two gall-gnats (male and female), under the glass, and others have since appeared. The gall, as I have said, is in form not unlike a tiny artichoke, in the heart of which a single larva lives through the winter in its nest of closely-fitting leaves, which diminish in size as they approach the centre. The gnat lays her egg in June, in the young and tender green shoots which are just then beginning to grow; these become crippled, and gradually assume the appearance I have described, offering food and shelter to the yellow-coloured larva during the winter months. In April or May it enters on the pupa stage of its existence, gathering intensity of colour as it approaches maturity, and in June it comes forth in the winged condition, a beautiful orange-coloured fly. For the benefit of those who may be more particularly interested in the Diptera, it may be well to describe more minutely the perfect insect, inasmuch as Professor Loew, though alluding to the artichoke galls at the end of the branches of *Taxus baccata*, says that the fly is still altogether unknown (*noch ganz ungewiss ist*), nor does Mr. Walker include the species among the 200 *Cecidomyias* he describes with such minuteness. I may just remark that the yew gall-gnat presents a tolerable appearance, being nearly equal in size to the well-known *C. rosaria*.

CECIDOMYIA TAXI, *Inchbald*.

Male. Antennæ apparently shorter than in the female, from the greater crowding of the joints, which are verticillate, pilose. Thorax testaceous, darker laterally, with a spot in front and two dark triangular spots behind. Abdomen orange, with dusky pile, forcipated. Legs darker in the upper half, paler in the lower.

Female. Antennæ testaceous as in the male, eighteen-jointed; joints petiolated, less densely pilose. Thorax as in the male. Wings ashy, with dusky pile in both sexes. Transverse veinlet somewhat beyond the middle of the subcostal vein. Abdomen orange, with paler oviduct. Legs dark, with gray pubescence.—*Peter Inchbald; Storthes Hall, near Huddersfield, September 2, 1861.*

[I am indebted to my kind correspondent for a series of specimens of this beautiful and interesting gall.—*E. N.*]

Capture of Ptinella gracilis in England.—I believe I may announce the occurrence of this very pretty little insect in England. Of the six species of *Ptinella* figured by Gillmeister, *P. gracilis* was the only one which we have hitherto failed to detect in this country. In August last I captured an extremely small-winged *Ptinella*, answering well to Gillmeister's figure of *P. gracilis* in size and shape; and although I have not yet had the opportunity of examining it thoroughly, I feel no doubt as to its identity with the species in question.—*A. Matthews; Gumley, Market Harborough, October 21, 1861.*

Phosphorescent Light produced by Nebria brevicollis.—One very dark and warm night, in the early part of the present month (October), I observed a considerable quantity of some brightly luminous matter on a gravel path in my garden. On a closer inspection I found that this consisted of many small detached patches, among which some animal was moving at a rapid pace, carrying with him a large quantity of the same luminous matter, and every now and then depositing a fresh patch. My curiosity was much excited by such a remarkable proceeding, and leaving Mrs. Matthews, who was with me, to watch the spot, I procured a light as quickly as possible, and discovered, to my surprise, that all this illumination had been the work of a *Nebria brevicollis*, who was literally detected *flagrante delicto*. I have often before this seen a strong phosphorescent light produced by various species, such as worms, centipedes, and the small white animals allied I believe to the Oniscidæ, so common in decaying vegetable substances; but this is the first instance I have met with of a coleopterous insect depositing any luminous matter on the ground. In all the cases of luminous deposit by worms, centipedes, &c., which I have had the means of examining, the animals had been recently injured, and the fluid oozing from the wound produced the luminous appearance. The *Nebria*, on the contrary, was perfectly sound, and seemed to be in a high state of pleasurable excitement. I can form no conjecture as to the cause of its proceedings, unless the light was intended for a sexual signal.—A. Matthews.

Eccentricities of Genius.—A Catalogue of European Lepidoptera, now in the press, which promises to be a most useful one, will shortly be published; it is from the pens of Dr. Staudinger and Dr. Wocke: in it will be found enumerated, with synonyms, 392 Rhopalocera, 179 Sphinges, 318 Bombyces, 975 Noctuæ, 719 Geometræ, &c. The Bombyces are headed by *Sarrothripa revayana*, *Earias vernana*, *E. clorana*, *Hylophila prasinana*, *H. quercana*, and the genus *Nola*, and conclude with two genera which have hitherto been placed amongst the Noctuæ, viz. *Thyatira* and *Cymatophora*. The Noctuæ begin with *Diloba cæruleocephala*, and include *Demas Coryli*, *Asteroscopus nubeculosa*, *A. Cassinea*, *Aventia flexula*, *Boletobia fuliginosa*, and the group of *Deltoides*.—H. T. Stainton, in 'Intelligencer,' September 7, 1861.

List of Trichoptera and Neuroptera captured near London in 1861.

By PERCY C. WORMALD, Esq.

THE following is a list of the Trichoptera and Neuroptera, which I have captured this year, in the neighbourhood of London:—

Phryganea grandis. Willesden and Hampstead; June.

P. varia. One specimen, Ruislip, Middlesex; August 24.

Glyphotælius pellucidus. West Wickham; May.

Colpotaulius incisus. Two specimens, Willesden; August 31 and September 9.

Limnephilus nitidus. One specimen, Hammersmith Marshes; June 13.

- L. vitratus*. Willesden, Kingsbury and Ruislip; August.
- L. rhombicus*. Willesden and Kingsbury; common, July and August.
- L. marmoratus*. Willesden, near Kew, &c.; August.
- L. vittatus*. West Wickham and Ruislip; July and August.
- L. centralis*. Hampstead, Epping Forest and Ruislip; June, August.
- L. hirsutus*, *Kolen*. Willesden; July and beginning of August.
- L. fumigatus*. Two specimens, Willesden; July 31 and August 31.
- Anabolia nervosa*. Willesden; very abundant, August to October.
- Stenophylax concentricus*, *Kolen*. Two specimens, Willesden; October 3.
- S. lateralis*. Three specimens, Kilburn; June.
- Hallesus digitatus*. Willesden; common, October 3.
- Goëra capillata*. Willesden and Kingsbury; August.
- G. fuscicornis*. Willesden and Kingsbury; common, August.
- Molanna angustata*. Willesden and Kingsbury; July and August.
- Leptocerus grossus*, *Steph*. Two specimens, Ruislip; August 24.
- L. fulvus*, *Ramb*. Ruislip; August. This species is new to Britain.
- L. cinereus*, *Curt*. Kingsbury, Willesden, Lewisham, and the banks of the Thames; common, August.
- L. dissimilis*. One specimen, Willesden; July 29.
- L. aterrimus*, *Steph*. Hampstead, &c.; June.
- L. bicolor*. Ruislip, Willesden, and the banks of the Thames; August.
- L. pilosus*. Hyde Park; common, June to August; also at Kingsbury, Ruislip and Willesden.
- Mystacides atra*, *Pict*. Willesden, &c.; common, August and beginning of September. I observed this species flying at noon in hot sunshine.
- Setodes conspersa*. One specimen, Hyde Park; July 15.
- S. lacustris*, *Pict*.? Willesden and Kingsbury; August and beginning of September.
- Agapetus funereus*. Willesden; August.
- Polycentropus concinnus*. Willesden; common, July and August.
- P. bimaculatus*. Kingsbury and Willesden; July to September.
- Tinodes pallescens*. Kingsbury and Lewisham; August.
- Psychomia pusilla*. Banks of the Thames; very abundant, August.
- Hydropsyche fulvipes*. Kingsbury and Lewisham; very common, August. It appears to fly soon after noon and a little before sunset.
- Besides these I have taken several other species (principally of *Polycentropus*), at present undetermined.

Most of the above have been obtained by sweeping with a net along the margins of streams, &c. The most productive time is about sunset and for an hour after; but I have taken some species (*Hydropsychidæ*, &c.) in this way at all times of the day.

Chrysopa flava. One specimen, beaten from an oak at West Wickham; August 26.

C. 7-punctata. One specimen, Kilburn; August 15.

Sisyra fuscata. Willesden, &c.; July and August.

S. terminalis. Beaten from trees on the banks of the Thames between Kew and Richmond, August 27. This species had, I believe, been previously taken only at the Lakes of Killarney, Ireland, by Mr. Curtis.

Hemerobius Humuli. Kilburn, Hampstead, &c.; very common.

H. micans. West Wickham; by beating fir trees; August.

H. nervosus. Kilburn and Hampstead; common on fences, &c.; July.

H. phaleratus. West Wickham, by beating fir trees; August.

Psocus bifasciatus, *Curt.*? One specimen, West Wickham; August 7.

Cloëon diptera, *L.* Hampstead; August 3.

PERCY C. WORMALD.

10, Priory Road, Kilburn,
October 24, 1861.

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

October 7, 1861.—JOHN LUBBOCK, Esq., Vice-President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors:—‘Transactions of the Zoological Society of London, Vol. iv. Part 7; ‘The Proceedings of the Scientific Meetings of the Zoological Society of London, 1861,’ Part ii.; presented by the Society. ‘Proceedings of the Literary and Philosophical Society of Liverpool, during the Fifteenth Session, 1860-61,’ No. xv.; by the Society. ‘Proceedings of the Royal Society,’ No. 45; by the Society. ‘The Zoologist’ for October; by the Editor. ‘Descripção de dois Insectos Coleopteros nas Costas orientaes do Oceano Indico, pelo Barão do Castello de Paiva, Professor de Botanico na Academia Polytechnica do Porto;’ by the Author. ‘Smithsonian Contributions to Knowledge,’ Vol. xii.; by the Smithsonian Institution. ‘The Journal of the Society of Arts’ for September; by the Society. ‘The Athenæum’ for August; by the Editor. ‘Sitzungsberichte der Königl. bayer. Akademie der Wissenschaften zu München;’ by the Academy. ‘The Entomologist’s Weekly Intelligencer,’ Nos. 257—260; by H. T. Stainton, Esq.

Election of a Member.

James Rome, Esq., M.A., &c., Woodlands, Hamilton, Lanarkshire, was elected a Member of the Society.

Exhibitions.

Mr. Pascoe exhibited a number of Coleoptera, selected from a large collection (about 1300 species) which he had made, during the preceding winter, in the South of France (Dep. du Var). One of these, the true *Carabus vagans*, is not found in the mountains, as M. Léon Fairmaire has stated in his 'Faune Française,' but in the low-lying ground near the sea, especially delighting to hide under the large leaves of the artichoke, in which situation it is often found in considerable quantities. An *Anophthalmus* (*A. Raymondi*, one of the numerous discoveries of that most indefatigable naturalist, M. Raymond), is found very sparingly in a small limestone cavern near Hyères: it is well worthy of note that the same species has been taken in the cellar of an old monastery at Marseilles: like all the blind beetles it runs very rapidly, and can only be taken with difficulty. Another recent discovery of M. Raymond's, *Anillus Gallicus*, *Aubé*, also blind, is only found beneath very large stones deeply embedded in the earth. *Amaurops Aubei*, one of the *Pselaphidæ*, and blind also, as its name implies, is found, but very rarely, beneath the bark of old pine-stumps (*Pinus halepensis*). *Faronus Lafertii*, a very remarkable *Pselaphidean*, resembling a *Staphylinus*, was not unfrequently found at the roots of grass, often associated with *Thorectus grandicollis*, *Germ.*, and *Trotoma pubescens*, *Kiesw.*, the latter sometimes in considerable numbers. Two insects belonging to families which in England are mostly found on flowers, *Atelestus hemipterus*, *Er.*, and *Anthicus Genei*, *Laf.*, may often be seen during the month of May running rapidly over stones on the coast within a few inches of the sea.

Mr. Pascoe also called especial attention to the fine, and until recently excessively rare, lamellicorn *Callicnemis Latreillei*, *Lap.*: this insect, he stated, was only to be found a very short time during the month of May, appearing for a few minutes on the sands at St. Raphael, just as the dusk was deepening into night; they disappeared immediately at the approach of a light, burying themselves in the loose sand from which they had just emerged: they only came out when the night was perfectly calm, and it was singular that while at Hyères they were only seen on the wing at St. Raphael they invariably confined themselves, as M. Raymond informed him (Mr. Pascoe), to crawling on the sand. Among the specimens which Mr. Pascoe exhibited were *Antidipnis rubripes*, *Perris*, found in the sand at the root of an *Artemisia*, and *A. Javeti*, *du Val*, from which it is perfectly distinct; *Ptilium filiforme*, a new species named but not yet described by Dr. Aubé, first found by M. Raymond in sand close to the sea; *Theca byrrhoides*, *Aubé*, a new genus allied to *Dorcatoma*, a single specimen of which he (Mr. Pascoe) had taken at St. Raphael; *Chœrorhinus squalidus*, *L. Fairm.*; *Auletes cisticola*, *L. Fairm.*; *Julodis Onopordi*, *Fab.* (from Toulon); *Lema Hoffmannseggi*, *Lac.*, and *Ceutorhynchus Raphaelensis*, *Chev.*; the latter, originally discovered by M. Raymond at St. Raphael, on young plants of the *Glaucium luteum*, and by carefully turning back the leaves of the unexpanded bud Mr. Pascoe stated he invariably found one or more individuals on every plant which he examined at Hyères. *Glaucium luteum*, or yellow horned poppy, abounds on many of our shores, and as this *Ceutorhynchus* has been recently found on the same plant at Paris, it is not unlikely that it may be added to our Fauna; the south coast of the Isle of Wight would seem to offer a very favourable locality.

Mr. Miller exhibited a small and beautiful moth of the family Geometrina, said to have been bred from a larva found in the vicinity of London, which fed on the exterior of the bedeguar, or mossy gall of the rose; it had been examined by Messrs. Doubleday and Newman, and considered by them as a species not yet known as an inhabitant of Britain.

Mr. Shepherd believed this insect would prove to be an extraordinary variety of *Ephyra pendularia*.

Messrs. F. Bond and S. Stevens were of the same opinion.

Professor Westwood remarked that at the meeting of the Society on the 4th of February last, Mr. Smith had sent for exhibition what were considered to be small pupa cases found attached to wasps' nests by Mr. Stone; he was now enabled to state that they were the eggs of the dipterous genus *Volucella*, well known to be parasitic in wasps' nests, Mr. Stone having forwarded to him the larvæ produced from them, which were undoubtedly those of *Volucella*. Professor Westwood exhibited the larva, which he observed was well figured by DeGeer, '*Histoire des Insectes*,' Vol. vi. plate 3. Professor Westwood had also been informed by Mr. Stone that he had found *Anthomyia incana* to be parasitic in wasps' nests; and the same accurate observer had detected the larva of *Ilythia sociella* in a nest of *Bombus sylvestris*; the cocoons of this moth had been frequently found in the vicinity of humble bees' nests, but he (Professor W.) had not previously heard of the larva having been actually discovered in the nests.

Professor Westwood also observed that he had, at the meeting of the Society on the 2nd of August, 1858, exhibited a mutilated Strepsipterous insect, sent to the late Mr. Spence by Herr Neitner, of Ceylon, who had found the specimen issuing from the body of a *Formica* found in that island. Professor Westwood had at the same time read a description of the insect, and published figures in the '*Transactions*,' forming for its reception the genus *Myrmecolax*. He had lately received from Herr Neitner an ant having one of these parasites protruding from the end of the abdomen; this he had had the pleasure of extracting, and exhibited it to the Meeting; he also found the head-cap of the pupa of a second specimen, proving that there had been two of the parasites within the ant. Professor Westwood added that he was now enabled to state, from the examination of this perfect example of the *Stylops*, that the figures and description he had published, from the damaged insect received in 1858, were on the whole tolerably accurate. He called especial attention to the remarkably large antennæ of this insect, exceeding those of any other genus of Strepsiptera.

Dr. Wallace read a list of rare or reputed British Lepidoptera which he had lately seen in a collection formed by a farmer in Suffolk; it included *Papilio Podalirius* (said to have been captured near Seven Oaks, Kent), *Parnassius Apollo* (said to have been taken in the Forest of Dean), and many other species of extremely rare or doubtful occurrence in Britain.

Dr. Knaggs exhibited living larvæ of the following species of *Eupithecia*, received from the Rev. Joseph Hellins, of Exeter, viz.:—*E. tripunctata*, *E. expallidata*, *E. virgaureata*, *E. subfulvata* and *E. succenturiata*. Dr. Knaggs pointed out the differences in the larvæ of the two last-named insects, which are by some entomologists considered to be varieties of one inconstant species: he stated that Mr. Hellins had noticed the larva of *E. succenturiata*, which feeds on mugwort, preferring the seeds, to be infested by an hymenopterous parasite, the larva of which, when full fed, eats its way out of the caterpillar and constructs a cocoon on its back; he had on one occasion

noticed a larva of the moth devouring one of the cocoons on the back of its neighbour, evidently mistaking it for a seed of the plant, which it exactly resembles in form.

Dr. Knaggs also exhibited the living larvæ of *Clostera anachoreta*, reared from the eggs deposited by a female bred during the present summer.

Mr. Waring exhibited some beautiful specimens of *Noctua sobrina*, *N. neglecta* and *Ypsolophus juniperellus*, taken in Scotland by Mr. Bouchard, during the past summer.

Mr. Waterhouse stated that he was anxious to correct three errors in his Catalogue of British Coleoptera, which had lately come to his knowledge; they consist of three species introduced into the list upon the authority of other entomologists, viz.:—*Homalota subterranea*, *Mulsant*; *Haploglossa rufipennis*, *Kraatz*, introduced on the authority of Mr. Janson; and *Ceuthorhynchus uliginosus*, *Walton*, taken from Mr. Walton's list of British Curculionidæ.

The *Homalota subterranea* of Mr. Janson I find, from the inspection of a specimen received from Mr. Janson by the British Museum, is the same as *Homalota scapularis* of my Catalogue.

The *Haploglossa rufipennis* of Mr. Janson is = *Haploglossa pulla* of my Catalogue, and is clearly not identical with *H. rufipennis* of *Kraatz*, of which there are specimens received from Dr. *Kraatz* in the Museum collection. The insect sometimes has the elytra pitchy black and sometimes rufescent, and has been recently taken in considerable numbers by Mr. Brewer, Mr. Rye and Mr. Lewis, always in the vicinity of the nests of the sand martin.

Ceuthorhynchus uliginosus of Walton is represented by a specimen presented by Mr. Walton to the British Museum, which I have carefully examined, and which proves to be *Cæliodes didymus*. It has a distinct rostral groove continued to the middle coxæ. A second specimen, named by Mr. Walton, is in Mr. Dale's collection, and has been kindly forwarded to me by its owner for examination; this is clearly a rubbed specimen of *Ceuthorhynchus litura*, as Mr. F. Smith had determined before I saw it.

Mr. Stainton read "A few Words on the Synonymy of *Laverna Langiella*."

Professor Westwood read descriptions of some new exotic *Lucanidæ*.—*E. S.*

Something like an Aquarium.—I have received a copy of the 'National Intelligencer,' Washington, September 26, in which is an account of the Boston Zoological Gardens. It appears from the following that our American brother naturalists have a tame whale and a pet dolphin, for we read:—"In the same tank with the white whale are two sturgeons, seven feet in length, likewise a fine specimen of a shark. There are also fifty other tanks, filled with fresh and salt water fish of the choicest specimens. Six hundred gallons of pure sea-water passes through the entire building per minute: the pipes for conveying the water are laid down through the streets of the city the same as ordinary water-pipes: eight hundred and sixty-four thousand gallons of this water passes through the central tank (which has a circumference of seventy-nine feet) per day."—*F. T. Buckland, in the 'Field.'*

[This is what I have always desired to see in this country, and at the period of the establishment of the Crystal Palace Company there was a strong feeling in favour of my project: it was, however, pronounced impracticable.—*Edward Newman.*]

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PREPARATIONS FOR THE MICROSCOPE.—

As there is great demand for the microscopical productions of our Fens, which are so rich in Insects, Infusoria, Characeæ, Algæ, Diatomaceæ, Desmidiæ, &c., I am persuaded by a number of my best friends to offer my services in the collecting of microscopical objects of all descriptions in the undrained Fens of Norfolk and surrounding Sea Coast, which are well calculated to repay those who would wish to contribute a small share towards the expense of working them. I propose to take a small number of Subscribers for Shares of the parts of Insects, Objects, Dissections, &c., mentioned, to be all properly mounted on slides in various ways, at the wish of Subscribers. Each Share to be One Guinea, and all the Objects to be equally divided among the Subscribers in November next. My object in the above proposition is to be enabled to thoroughly explore the microscopic productions of our Fens, as all my time will be devoted to the subject. Gentlemen who wish to subscribe to the above will please send their names and subscriptions as early as possible, as the number of Subscribers is limited. A list of all the Subscribers will be sent to each on the 3rd of December. To begin from this date and end on the 10th of November, 1862.—W. WINTER, *Aldeby, Beccles*, October 26, 1861.

COMPLETE SET OF 'THE ZOOLOGIST.'

MR. J. C. STEVENS will Sell by Auction, this present Friday, Nov. 1, at his Great Room, 38, King Street, Covent Garden, one complete set of the 'Zoologist,' up to the end of 1860.

A HISTORY of BRITISH MOTHS. By the Rev. F. O. MORRIS. With coloured Figures of every Species. Upwards of 30 on the average, monthly, 2s. By the same Author, ANECDOTES in NATURAL HISTORY, 5s., and RECORDS of ANIMAL SAGACITY AND CHARACTER, 5s. London: Longman & Co.